



ISO Registered Company

MODEL P1

SINGLE STAGE PRESSURE REDUCING REGULATOR

OVERVIEW

The Model P1 is designed for gases and liquids with inlet pressures up to 3600 psig (248 Barg). Standard adjustable outlet ranges from 1-10 psig (.07-.69 Barg) through 10-750 psig (.69-51.7 Barg). Flow coefficient of 0.02, 0.06, and 0.20 available. This versatile point of use regulator can be ordered with a variety of options to meet your system demands. Standard construction includes 40 micron integral filter and diffusion resistant stainless steel diaphragm.

FEATURES

- Accurate Adjustment
- Low Internal Volume
- Low Operating Torque
- Suitable for corrosive applications

TYPICAL APPLICATIONS

- Instrumentation
- Analyzer Systems
- Gas Cabinets
- Inline Point of Use
- Suitable for Corrosive
- Suitable for High Purity Gas
- Suitable for Hydrogen

FUNCTIONAL PERFORMANCE

Supply Pressure Effect: 0.5/100 psig (.03/6.89 Barg)

Temperature Coefficient: 0.16 psig/°F (.01Barg/°C)

Internal Volume: 6.9 cc

Design Leakage:

Outboard: 1x10⁻⁹ scc/sec He

Inboard: 1x10⁻⁹ scc/sec He



MODEL P1



LINE SIZES AVAILABLE

1/4" (DN8), 3/8" (DN10), 1/2" (DN15)



END CONNECTIONS

FNPT, TUBE ENDS, TRI-CLAMP



COMMON APPLICATIONS

ANALYZER SYSTEMS, GAS CABINETS, CORROSIVES, HIGH PURITY GAS, HYDROGEN



DESIGN PRESSURE

INLET: UP TO 3600 psig (248 Barg)
OUTLET: UP TO 750 psig (51.7 Barg)

GENERAL SPECIFICATIONS

Inlet & Outlet Size:	1/4", 3/8" & 1/2" (DN8, DN10 & DN15)	Trim Temperature Limits:	See Table 2
CV Capability:	0.02, 0.06 and 0.20	Operating Temp Range:	See Table 1 and 2
Maximum Inlet Pressure:	See Table 1	Range Spring Material:	Steel or Stainless Steel
Outlet Pressure:	See Table 1	Composite Knob (Standard)	-50 to 200°F (-45.6 to 93°C) For temperatures outside (Std.) knob range see Options for Colored Knobs
Body End Connections:	FNPT, Tube Ends, Tri-Clamp - 1/2" (DN15) Port "A" Only		
Body / Spring Chamber Material:	316L SST/316 SST Brass/6061 AL Brass/316L SST <u>Sanitary Construction:</u> 16 micro-inch Ra wetted surface finish. Electropolished stainless steal finish.		

TECHNICAL SPECIFICATIONS

TABLE 1

MODEL P1 DESIGN PRESSURE VS. TEMPERATURE RATINGS

FNPT AND TUBE END CONNECTION RATINGS IN ACCORDANCE WITH ASME B31.3

TRI-CLAMP END CONNECTION RATINGS IN ACCORDANCE WITH ASME BPE

BODY/SP. CHAMBER MATERIAL ⁴	LINE SIZE	END CONNECTION	INLET PRESSURE		OUTLET PRESSURE		TEMPERATURE	
			Psig	(Barg)	Psig	(Barg)	°F	(°C)
BRASS/6061 AL^{1,3}	1/4" (DN8)	FNPT	3600	(248)	500	(34.5)	-325 to 400	(-198 to 204)
	3/8" (DN10)	FNPT	3600	(248)	500	(34.5)	-325 to 400	(-198 to 204)
	1/2" (DN15)	FNPT	3600	(248)	500	(34.5)	-325 to 400	(-198 to 204)
BRASS/316 SST¹	1/4" (DN8)	FNPT	3600	(248)	750	(51.7)	-325 to 400	(-198 to 204)
	3/8" (DN10)	FNPT	3600	(248)	750	(51.7)	-325 to 400	(-198 to 204)
	1/2" (DN15)	FNPT	3600	(248)	750	(51.7)	-325 to 400	(-198 to 204)

¹Ratings for brass body materials shall not exceed 3000 Psig (206 Barg) and 400°F (200°C) in oxygen service. (CGA G-4.4)

²Ratings for 316L SST body materials shall not exceed 375 Psig (26 Barg) and 400°F (200°C) in oxygen service. (CGA G-4.4)

³6061 AL is prohibited for use in oxygen service. (CGA G-4.4)

⁴Pneumatic dome loaded outlet pressures shall not exceed 125 Psig (8.6 Barg) for all temperatures.

TABLE 1 (Continued)
MODEL P1 DESIGN PRESSURE VS. TEMPERATURE RATINGS
FNPT AND TUBE END CONNECTION RATINGS IN ACCORDANCE WITH ASME B31.3
TRI-CLAMP END CONNECTION RATINGS IN ACCORDANCE WITH ASME BPE

BODY/SP. CHAMBER MATERIAL ⁴	LINE SIZE	END CONNECTION	INLET PRESSURE		OUTLET PRESSURE		TEMPERATURE	
			Psig	(Barg)	Psig	(Barg)	°F	(°C)
316L SST/316 SST ²	1/4" (DN8)	FNPT	3600	(248)	750	(51.7)	-325 to 500	(-198 to 260)
			3415	(235)	710	(48.9)	600	(315)
		TUBE END (0.035" WALL)	3600	(248)	750	(51.7)	-325 to 500	(-198 to 260)
			3415	(235)	710	(48.9)	600	(315)
	3/8" (DN10)	FNPT	3600	(248)	750	(51.7)	-325 to 500	(-198 to 260)
			3415	(235)	710	(48.9)	600	(315)
		TUBE END (0.035" WALL)	3300	(228)	750	(51.7)	-325 to 300	(-198 to 149)
			3200	(220)	750	(51.7)	400	(204)
			3000	(206)	750	(51.7)	500	(260)
			2800	(193)	710	(48.9)	600	(315)
	1/2" (DN15)	FNPT	3600	(248)	750	(51.7)	-325 to 500	(-198 to 260)
			3415	(235)	710	(48.9)	600	(315)
		TUBE END (0.065" WALL)	3600	(248)	750	(51.7)	-325 to 500	(-198 to 260)
			3415	(235)	710	(48.9)	600	(315)
		TRI-CLAMP	200	(13.79)	200	(13.79)	-325 to 100	(-198 to 38)
			165	(11.38)	165	(11.38)	250	(121)

¹Ratings for brass body materials shall not exceed 3000 Psig (206 Barg) and 400°F (200°C) in oxygen service. (CGA G-4.4)

²Ratings for 316L SST body materials shall not exceed 375 Psig (26 Barg) and 400°F (200°C) in oxygen service. (CGA G-4.4)

³6061 AL is prohibited for use in oxygen service. (CGA G-4.4)

⁴Pneumatic dome loaded outlet pressures shall not exceed 125 Psig (8.6 Barg) for all temperatures.

TABLE 2
MODEL P1 TRIM MATERIALS

TRIM COMPONENT	TRIM CODE (POSITION 6 ON CODER SHEET)									
	1	2	3	4	5	6	P NACE	R NACE	Q SANITARY	S SANITARY
ACTUATOR DIAPHRAGM	302 SST	302 SST	302 SST	INCONEL 718	INCONEL 718	INCONEL 718	INCONEL 718	INCONEL 718	302 SST	302 SST
ACTUATOR	316L SST	316L SST	316L SST	MONEL R405	MONEL R405	MONEL R405	316L SST	316L SST	316L SST	316L SST
ACTUATOR HEX NUT ¹	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	316L SST	316L SST
GASKETS OR DIAPHRAGM LINER ²	PTFE GASKET	PTFE GASKET	PTFE GASKET	PTFE LINER	PTFE LINER	PTFE LINER	PTFE LINER	PTFE LINER	PTFE LINER	PTFE LINER
O-RING	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
POPPET	316L SST	316L SST	316L SST	MONEL R405	MONEL R405	MONEL R405	316L SST	316L SST	316L SST	316L SST
POPPET SPRING	INCONEL X750	INCONEL X750	INCONEL X750	INCONEL X750	INCONEL X750	INCONEL X750	INCONEL X750	INCONEL X750	INCONEL X750	INCONEL X750
SEAT (MAIN)	PCTFE	POLYAMIDE	PTFE	PCTFE	POLYAMIDE	PTFE	PCTFE	PTFE	PTFE	PTFE
SEAT RETAINER	316L SST	316L SST	316L SST	MONEL R405	MONEL R405	MONEL R405	316L SST	316L SST	316L SST	316L SST
SCREEN FILTER	316L SST	316L SST	316L SST	316L SST	316L SST	316L SST	316L SST	316L SST	--	--
SEAT (SELF RELIEVING)	PCTFE	POLYAMIDE	PTFE	PCTFE	POLYAMIDE	PTFE	PCTFE	PTFE	PTFE	PTFE
SR BUTTON	316L SST	316L SST	316L SST	MONEL R405	MONEL R405	MONEL R405	316L SST	316L SST	316L SST	316L SST
VACUUM ASSIST SPRING	17-7PH SST	17-7PH SST	17-7PH SST	17-7PH SST	17-7PH SST	17-7PH SST	17-7PH SST	17-7PH SST	17-7PH SST	17-7PH SST
TEMPERATURE RANGE	-325 to +380°F	-325 to +400°F	-325 to +380°F	-325 to +400°F				-325 to +500°F		
	-198 to +193°C	-198 to +204°C	-198 to 193°C	-198 to +204°C				-198 to +260°C		

¹ALUMINUM REPLACED WITH 316L SST IN OXYGEN CLEANING CONFIGURATIONS.

²DIAPHRAGM LINER REPLACES BOTH GASKET AND ACTUATOR GASKET WHEN SELECTED.

STANDARD CONSTRUCTION

Captured Vent Spring Chamber - The captured vent is designed to pipe away flammable or toxic vapors to a safe location in the event of diaphragm leakage or failure. It features a 1/8" FNPT port located on the spring housing. Not available with pneumatic dome loaded or panel mount options.

OPTIONS

NACE Construction - Internal wetted portions meet NACE standard MR0175, when the exterior of the regulator is not directly exposed to a sour gas environment, buried, insulated or otherwise denied direct atmospheric exposure. Available with 316L/316 SST body and spring chamber only.

Pneumatic Dome Loaded - The pneumatic dome loaded option replaces the standard spring chamber, range spring, adjusting screw, and knob with a cover dome that uses a pneumatic signal for actuation. This allows for regulator pressure settings to be adjusted from a remote location. **NOTES:** Diaphragm failure will result in loading fluid to mix with the process being controlled. Maximum Loading Pressure is 125 psig (8.6 Barg). Not available with self-relieving or self-relieving with mechanical stop. Not available for use with captured vent, panel mount, tamper proof, colored knobs, self-relieving or self relieving with mechanical stop options.

Mounting Bracket - Includes a 303 stainless steel mounting bracket fastened to the bottom of the regulator body that allows mounting to a flat surface. See DIMENSIONS AND WEIGHTS section for mounting hole pattern dimensions.

Panel Mount - Includes a panel nut that allows the spring chamber and control knob to be secured through a panel wall. Requires 1/8" minimum panel thickness and 1-3/8" diameter hole. The panel mount option prevents proper use of the captured vent spring chamber and is not available with the dome loaded option.

Tamper Proof - In this feature the control knob is removed and replaced with an acorn nut. The user can set the outlet pressure and securely tighten the nut, preventing any unwanted adjustments on the regulator.

Colored Knobs - In this feature the control knob is anodized aluminum either in black, blue, or red, compared to the standard red composite knob. This allows for color coding of processes. Temperature range: -55 to 300°F (-45.6 to 149 °C).

Relief Valve - This option installs an adjustable spring loaded relief valve into an outlet gauge port and prevents excess downstream pressures due to system malfunctions. Both ends of the relief valve are 1/4" MNPT and can be piped away to a safe location. Requires an outlet gauge port configuration or an additional outlet gauge port when an outlet pressure gauge is specified. Not available for use with self-relieving, self-relieving and mechanical stop, or vacuum assist spring options. Relief valve pressure setting must be specified at time of order.

Self-Relieving - The self-relieving option features an integral mechanism allowing downstream pressure to be vented as the outlet pressure setting is decreased. This allows the user to easily and rapidly decrease the pressure in a closed, or low volume system without an auxiliary bleed valve. In addition, this option also functions as a sensitive relief valve. The pressure at which it relieves is automatically determined by the outlet pressure setting of the regulator. Not available with dome loaded, relief valve, self-relieving and mechanical stop, or vacuum assist.

Self-Relieving & Mechanical Stop - Same as self-relieving except construction includes mechanical stop to limit maximum outlet setting. Not available with relief valve, self-relieving, or self relieving and mechanical stop options.

Vacuum Assist Spring - In this feature a vacuum assist spring is placed under the diaphragm. This spring prevents the diaphragm from collapsing during a vacuum purge. Not available with relief valve, self-relieving, or self relieving and mechanical stop options.

OPTIONS

Cleaned for Oxygen Service #S-1134 - Cashco cleaning specification that is required for gaseous oxygen service. This specification is compliant with CGA G-4.4 and includes sealed enclosure bag and notification tag stating suitability for gaseous oxygen service. For use with PTFE and PCTFE seat disc materials only. See Notes 1 - 3 on Table 1 for material and ratings restrictions.

Cleaned per Spec. #S-1542 - Cashco cleaning specification similar to S-1134 that includes sealed enclosure bag and notification tag stating suitability for non-oxygen service.

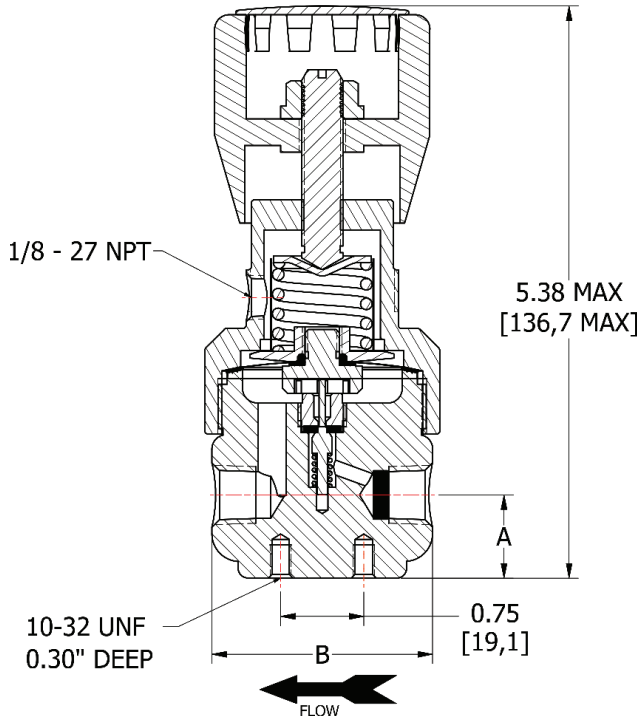
Sanitary Construction - Special construction intended for use in sanitary service. Available with 316L stainless steel body material only. Available with tube ends (all line sizes) or 1/2" sanitary clamp end connections compliant to ASME BPE Type A dimensions. Electropolished finish with 16 micro-inch Ra wetted surface finish. Available with PTFE soft goods only compliant with FDA 21 CFR 177.2600 and USP Class VI. Requires selection for Cashco cleaning specification S-1576 and includes enclosure bag and notification tag. Available in port configuration A only and spring ranges up to 250 Psig (17.2 Barg). Not available with colored knobs or relief valve options.

Cleaned for Hydrogen Service #S-1821 - Cashco cleaning specification that is required for gaseous hydrogen service. This specification is compliant with CGA G-5.4 and includes sealed enclosure bag and notification tag stating suitability for gaseous hydrogen service.

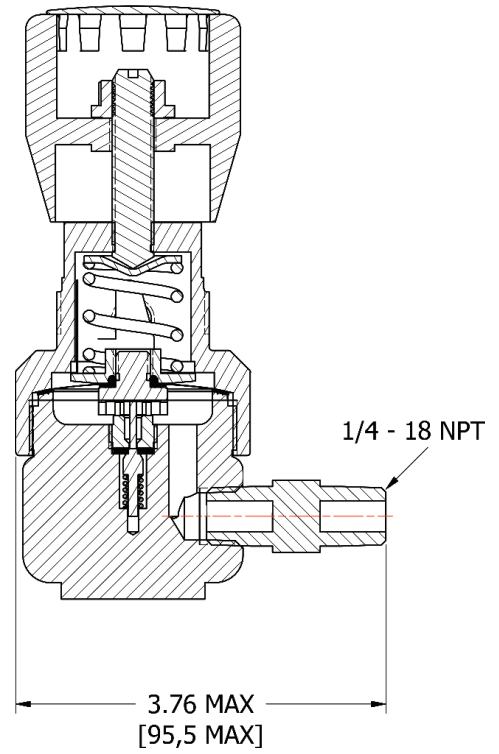
Tube End Connections - Available for all line sizes for weld-in applications. 0.035" (0.89 mm) wall thickness for 1/4" (DN8) and 3/8" (DN10) line sizes. 0.065" (1.65 mm) wall thickness for 1/2" (DN15) line sizes. Available for 316L stainless steel body material only.

Cleaned for Sanitary Service #S-1576 - Cashco cleaning specification that is required for sanitary service. Includes sealed enclosure bag and notification tag stating suitability for food and pharmaceutical service. Must use with sanitary construction. Not available with colored knobs or relief valve option.

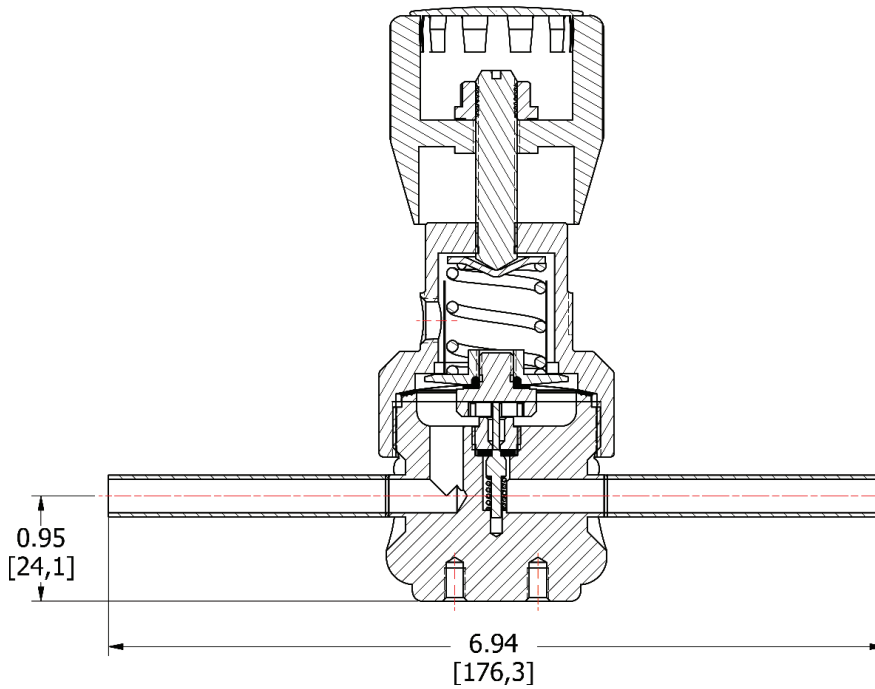
DIMENSIONS AND WEIGHTS



STANDARD

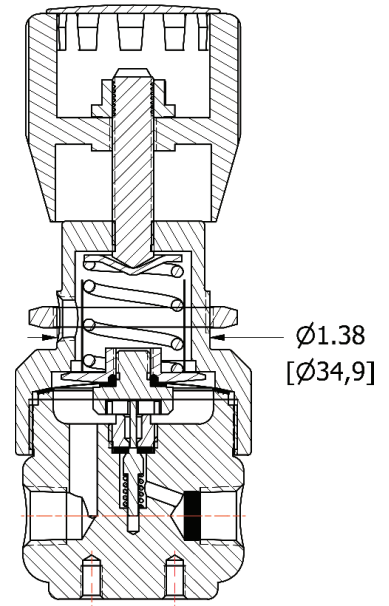
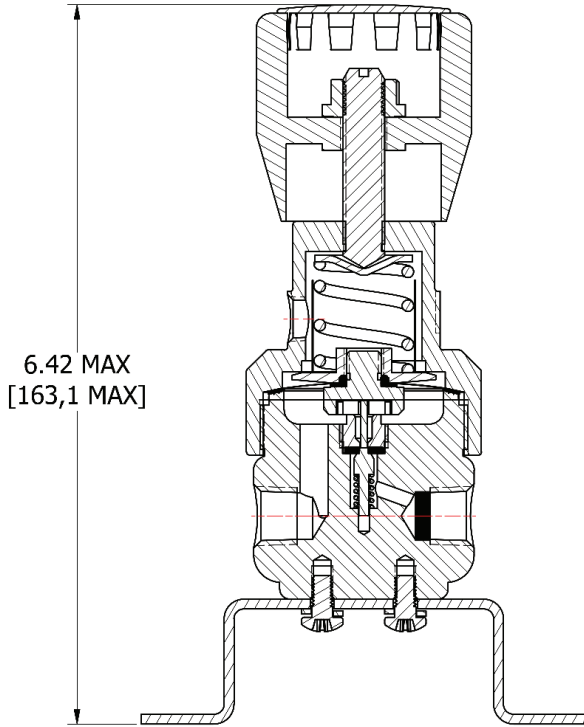


RELIEF VALVE

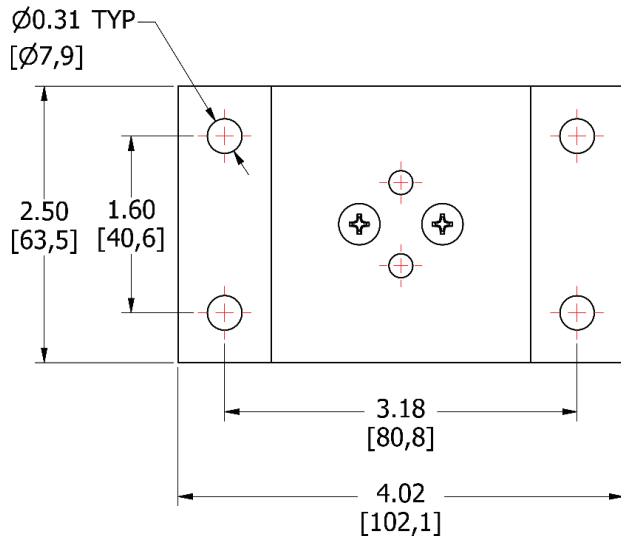


TUBE END

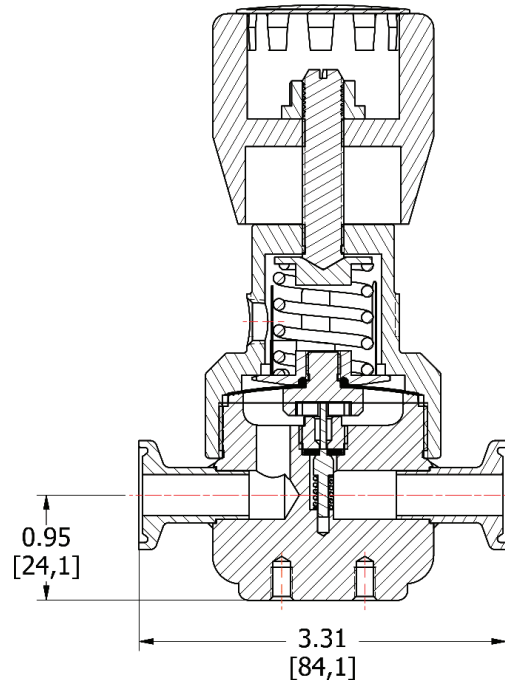
DIMENSIONS AND WEIGHTS



PANEL MOUNT

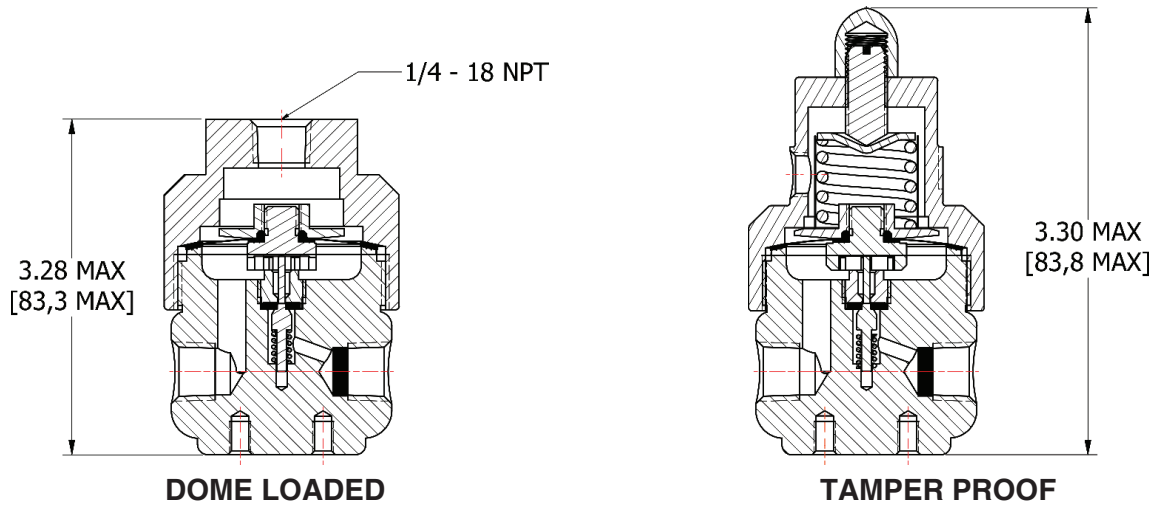


MOUNTING BRACKET



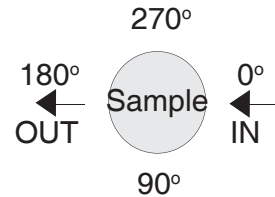
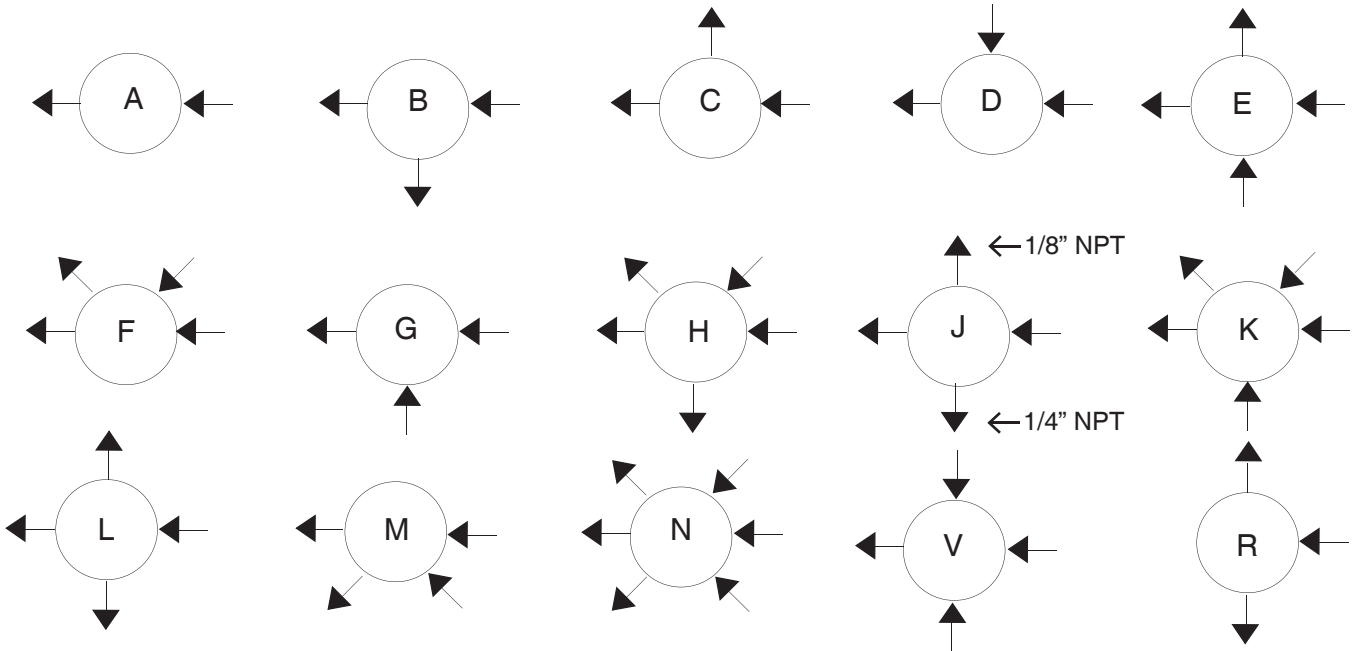
**TRI-CLAMP END
1/2" (DN10)**

DIMENSIONS AND WEIGHTS



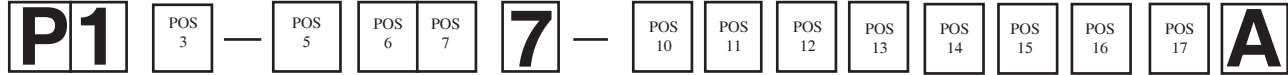
English Units In. & lbs.			
Size	A	B	Wt
1/4", 3/8" NPT	.75	2.00	2.2
1/2" NPT	.88	2.48	2.2
Metric Units mm & kg			
DN8, DN10 NPT	19	50	1.0
DN15 NPT	22	63	1.0

PORTING CONFIGURATION GUIDE



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MODEL P1 PRODUCT CODER 03/31/22
(COMPOSITE RED KNOB STANDARD)



POSITION 3 - BODY SIZE / Cv		
Size	Cv	CODE
1/4" (DN8)	0.02	1
	0.06	2
	0.20	3
3/8" (DN10)	0.02	4
	0.06	5
	0.20	6
1/2" (DN15)	0.02	7
	0.06	8
	0.20	9

POSITION 5- BODY & SPRING CHAMBER MATERIAL	
Body / Spring Chamber	CODE
Brass / 6061 AL *	B
316L SST / 316L SST	S
Brass / 316L SST	T

* Not Available with Option 55 O2 Cleaning

POSITION 6 - TRIM MATERIALS		
Diaphragm , Seat Retainer, Poppet & Poppet Spring	Seat Material	CODE
302 SST with PTFE Gasket, 316L SST, 316L SST, Inconel X-750	PCTFE	1
	Polyimide	2
	PTFE	3
Inconel with PTFE liner, Monel R-405, Monel R-405 Inconel X-750	PCTFE	4
	Polyimide	5
	PTFE	6
NACE Const. - Inconel with PTFE liner, 316L SST, 316L SST, Inconel X-750	PCTFE	P
	PTFE	R
For Sanitary / Pharmaceutical Construction		
302 SST with PTFE liner, 316L SST, 316L SST, Inconel X-750	PTFE	Q
	PTFE	S

POSITION 7 - PORTING CONFIGURATION	
Description	CODE
See Porting Guide	A
	B
	C
	D
	E
	F
	G
	H
	N
	J
	K
	L
	M
R	
V	

POSITION 10 - END CONNECTIONS	
End Connection(s)	CODE
FNPT	1
Tri-Clamp End	S
Tube End	T

POSITION 11 - RANGE SPRING	
Psig (Barg)	CODE
Pneumatic Dome Loaded 0 - 125 (0 - 8.6)	0
1 - 10 (.07 - .69)	1
2 - 25 (.14 - 1.7)	2
2 - 50 (.14 - 3.4)	3
2 - 100 (.14 - 6.9)	4
3 - 250 (.21 - 17.2)	5
5 - 500 (.34 - 34.5)	6
10 - 750 (.69 - 51.7) ‡	7

‡ Only Available with SST Spr. Chamber

POSITION 12 - OUTLET GAUGE (See "NOTE" - Position 7)	
Psig (Barg)	CODE
0 - 15 (0 - 1.0)	A
0 - 30 (0 - 2.1)	B
0 - 60 (0 - 4.1)	C
0 - 100 (0 - 6.9)	D
0 - 160 (0 - 11.0)	E
0 - 300 (0 - 20.7)	F
0 - 600 (0 - 41.4)	G
0 - 1000 (0 - 69.0)	H
No Outlet Gauge	0

POSITION 13 - INLET GAUGE (See "NOTE" - Position 7)	
Psig (Barg)	CODE
0 - 15 (0 - 1.0)	A
0 - 30 (0 - 2.1)	B
0 - 60 (0 - 4.1)	C
0 - 100 (0 - 6.9)	D
0 - 160 (0 - 11.0)	E
0 - 300 (0 - 20.7)	F
0 - 600 (0 - 41.4)	G
0 - 1000 (0 - 69.0)	H
0 - 2000 (0 - 137.9)	I
0 - 3000 (0 - 206.9)	J
0 - 5000 (0 - 344.9)	K
No Inlet Gauge	0

POSITION 14 - MOUNTING OPTIONS	
OPTIONS	CODE
No Option	0
Mounting Bracket.	5
Panel Mount	C

POSITION 15 - KNOB OPTIONS	
OPTIONS	CODE
No Option	0
Tamper Proof.	1
Black Knob.	2
Blue Knob.	8
Red Knob.	W

POSITION 16 - OPTIONS	
OPTIONS	CODE
No Option	0
Relief Valve: 3-50 psig.	H
Relief Valve: 50-150 psig.	J
Relief Valve: 150-350 psig.	K
Relief Valve: 350-600 psig.	L
Self-Relieving.	S
Self-Relieving & Mechanical Stop.	T
Vacuum Assist Spring.	V

POSITION 17 - OPTIONS	
	CODE
No cleaning specification	0
Cleaned For Oxygen Service Per Cashco Specification S-1134	M
Cleaned For Non-Oxygen Service Per Cashco Specification S-1542	N
Cleaned For Sanitary Service Per Cashco Specification S-1576	P
Cleaned For Hydrogen Service Per Cashco Specification S-1821	R

*** For information on ATEX see pages 8 & 9 on the IOM.**